TOPIC APPROVAL

PROPOSAL FOR TOPIC APPROVAL TO BE SUBMITTED TO THE UNIVERSITY OF MUMBAI FOR THE PH. D DEGREE IN THE SUBJECT OF MANGEMENT STUDIES

Title of the topic	:	**A study on Adoption of AI-powered Agile Project Management by extending Unified Theory of Acceptance and Use of Technology Model**
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A study on Adoption of AI-powered Agile Project Management by extending Unified Theory of Acceptance and Use of Technology Model.

Research Proposal

Submitted in the partial fulfilment of the requirement of
the degree of

Doctor of Philosophy (Ph.D.)

In the subject of Management Studies

Submitted by

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Guided by

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1. Introduction

1.1 Background

The use of artificial intelligence (AI) is progressively permeating various aspects of peoples' life. AI is designed to make life easier for individuals and to help them in a number of circumstances. The study looks at the influencing variables that affect consumers' behavioural intentions and use of items incorporating or utilising AI. The Technology Acceptance Model is a well-known method for studying how new technologies are received (TAM). For investigations on the intention to act or use and the use behaviour of new technologies, several studies use this fundamental model of acceptance and/or extensions (TAM2, TAM3, UTAUT, and UTAUT2). There aren't many studies that apply these theories to people's behavioural intentions to utilise items with AI in them. Studies on agile project management are among them.

The goal of this study is to look into how acceptance model influences behavioural intention and usage behaviour for items containing AI in a real-world setting. We first provide an explanation of why the UTAUT2 model is the foundation of our measurement. We build on this fundamental concept by adding the components of sustainability, personal inventiveness, comfort, convenience, and health. With regard to our research topic, we construct theory-based hypotheses for each impact variable in the model. The construct measures of our research model as well as our research technique, including data collection and sampling, are then demonstrated. Then, in order to estimate our model and test the associated hypotheses, we compute our route analysis. Applying partial least squares.

1.2 About Agile and Agile Framework

Agile project management and software development is an iterative method that helps teams 1offer value to clients faster and with fewer headaches. An agile team delivers work in tiny, digestible increments rather than relying on a "big bang" launch. Teams have a natural mechanism for adjusting to change fast because requirements, strategies, and results are evaluated on a regular basis. (What is Agile? | Atlassian, 2022)

An Agile framework is a method for planning, managing, and completing projects. Agile frameworks are usually divided into two types: (Berman, n.d.)

1. Frameworks for teams,
2. Assist businesses practise Agile at scale across several teams. (Organization)

There is no one-size-fits-all Agile framework. The ideal approach for your team or organisation will be determined by a number of parameters, including your sector, Agile readiness, the number of Agile teams, and overall Agile targets.

The most common Agile frameworks below, as well as provide resources to assist you in selecting the best Agile process fit your purposes. (Berman, n.d.)

1.2.1 Team Level

1.2.1.1 Scrum

The Scrum framework for teams is one of the most well-known Agile frameworks. Scrum is defined as "a framework within which people can address complex adaptive challenges while producing and delivering solutions of the highest possible value," according to the Scrum Guide. Scrum is designed to be lightweight and simple to grasp by definition. Some may argue, however, that mastering it is tough. The use of time-boxed iterations is the most identifiable aspect of Scrum: Scrum teams work in sprints, which last anything between two and four weeks. Sprinting allows teams to deliver swiftly and predictably while remaining flexible enough to pivot as needed. (Berman, n.d.)

1.2.1.2 XP

Another team-level Agile paradigm with roots in software development is Extreme Programming (or XP). XP, like most Agile methodologies, provides for frequent releases in short development sprints that encourage change as necessary. XP is less regulated than many Agile frameworks, and instead of steps, it embraces a set of morals. The following are some of XP's values and principles: Communication, Simplicity, Feedback, Respect, Courage.

Developers must first design and comprehend the customer's user stories—informal descriptions of features and feature requirements—in order to implement Extreme Programming. (Berman, n.d.) [

1.2.1.3 Kanban

Kanban is a Japanese word that means "visual signal" or "card." Although Kanban has its origins in manufacturing, it has been widely used to software development and other sorts of knowledge work. Kanban is a popular technique among Lean and Agile teams, and it may be integrated into other Agile frameworks. Kanban is a popular technique among Lean and Agile teams, and it may be integrated into other Agile frameworks. Physical or digital boards are used to depict a team's or organization's unique approach in this methodology more efficiently and with better agility. Kanban is a popular technique among Lean and Agile teams, and it may be integrated into other Agile frameworks. (Berman, n.d.)

1.2.1.4 Scrumban

Scrumban is an Agile framework that combines Scrum and Kanban. It was created to fulfil the demands of teams who wanted to reduce batching and embrace a pull-based system. This Agile framework, which combines parts of Scrum and Kanban, allows teams to react to stakeholder and production needs without feeling overloaded by their project methodology. Scrumban can also be employed as a bridge between Scrum and Kanban for teams transitioning from Scrum to Kanban. Scrumban allows teams can learn how to use Kanban to perform constant improvement without sacrificing the Scrum structure. (Berman, n.d.)

1.2.1.5 Scrum of Scrums

Scrum of Scrums intends to expand on Scrum's team-level concepts while also allowing enterprises to interconnect several Scrum teams that need to work together to produce complicated solutions. Regardless of the fact that Scrum of Scrums is an approach for spreading Scrum over numerous teams, it is not considered one of the actual scaling Agile frameworks because it lacks the concrete guidance required to scale Agile across an organisation. This method can assist teams in balancing small team numbers and the need to develop complicated products. Complex goods (or services) necessitate the collaboration of several cross-functional teams. Scrum of Scrums enables enterprises to scale the success of their present Scrum teams without having to change their procedures dramatically. (Berman, n.d.)

1.2.2 Organization Level (Scaling Agile)

1.2.2.1 SAFe- Scaled Agile Framework

It is one of several Agile frameworks meant to help businesses scale Agile beyond individual teams. Many team-level Agile techniques are incorporated into SAFe. SAFe, in particular, assists large businesses in navigating the obstacles of deploying, extending, and employing Agile techniques and practises across various teams and departments. SAFe was built by and for practitioners, based on three main sources of knowledge:

a) Agile software development

b) Lean product development
c) Systems thinking

SAFe is a systematic strategy that helps organisations achieve alignment, improve cooperation, increase flexibility, and increase predictability across many Agile teams. (Berman, n.d.)

1.2.2.2 DA- Disciplined Agile

Disciplined Agile (DA) is a lightweight Agile methodology that helps teams practise Agile at scale. DA is often thought of as a combination of XP, Scrum, Kanban, and other Agile frameworks because it promotes a "people-first" approach to Agile. Because it does not teach basic Agile ideas or practises, Disciplined Agile is best suited for organisations that are already familiar with them. DA, on the other hand, might be a winning technique for established Agile organisations looking for a lightweight, hybrid scaling solution. (Berman, n.d.)

1.2.2.3 LeSS- Large Scale Scrum

Scrum is a real team-based Agile paradigm, with minimal direction on how to scale to several teams. Many teams find Scrum to be effective and want to scale it without losing the aspects of Scrum that have proven to be effective. LeSS (Large Scale Scrum) might be a useful Agile framework for these teams. LeSS adapts the Scrum fundamentals to work with many teams. LeSS works well when all of the teams involved are working on the same product or value stream, but it is not the proper Agile framework for a company wanting to grow Agile throughout its portfolio. (Berman, n.d.).

1.2.2.4 Nexus

Nexus is another Agile framework that draws on the Scrum foundations. It stresses minimising and managing dependencies amongst Scrum teams as a road toward agility, and it is intended for building and maintaining product delivery projects at scale. Nexus refers to a group of three to nine Scrum teams working together to develop a single product in this scaled Agile methodology. Each Nexus has a single Product Owner who is in charge of the Product Backlog for that Nexus. Nexus' creators are adamant about sticking to the basic elements of Scrum, expanding the scope of Scrum only when it allows several Scrum teams to collaborate on a project. (Berman, n.d.).

1.2.2.5 Spotify Agile

Spotify, the audio streaming platform, is credited with introducing many people to Agile, to the point where a particular version of Agile that they originally used and popularised is known as the Spotify Model. The Spotify Model is a self-contained, people-driven approach to Agile scaling. It's not so much a framework as it is a great example of Agile at scale from a technical standpoint. Spotify engineers described their method to scaling Agile (in the now-famous document Scaling Agile @ Spotify) and shared it with the world, and many organisations have tried to emulate it since. Many Agile thinkers, including the author of Scaling Agile @ Spotify, have concluded that the Spotify Model is essentially a pre-Scrum@Scale version of Scrum. (Berman, n.d.).

1.2.2.6 Scrum@ Scale(S@S)

Scrum@Scale, another Agile framework meant to help organisations implement Scrum (you guessed it!) at scale, is credited to Jeff Sutherland, a well-known Agile expert who created the Scrum Guide. Scrum@Scale incorporates aspects of: (Berman, n.d.).

1. Scrum
2. Complex Adaptive Systems theory
3. Game theory

4. Object-oriented technology

1.3 Agile Project Management

Agile project management is an incremental method to project delivery that takes place across the course of the project's life cycle. Iterative or agile life cycles are made up of multiple iterations or incremental steps that lead to a project's completion. Because iteration allows you to alter as you go instead of pursuing a straight path, iterative approaches are frequently employed in software development projects to promote velocity and adaptability. An agile or iterative strategy strives to deliver benefits throughout the process rather than just at the end. Trust, adaptability, empowerment, and cooperation should all be essential ideals and attitudes in agile initiatives. (Agile project management, n.d.)

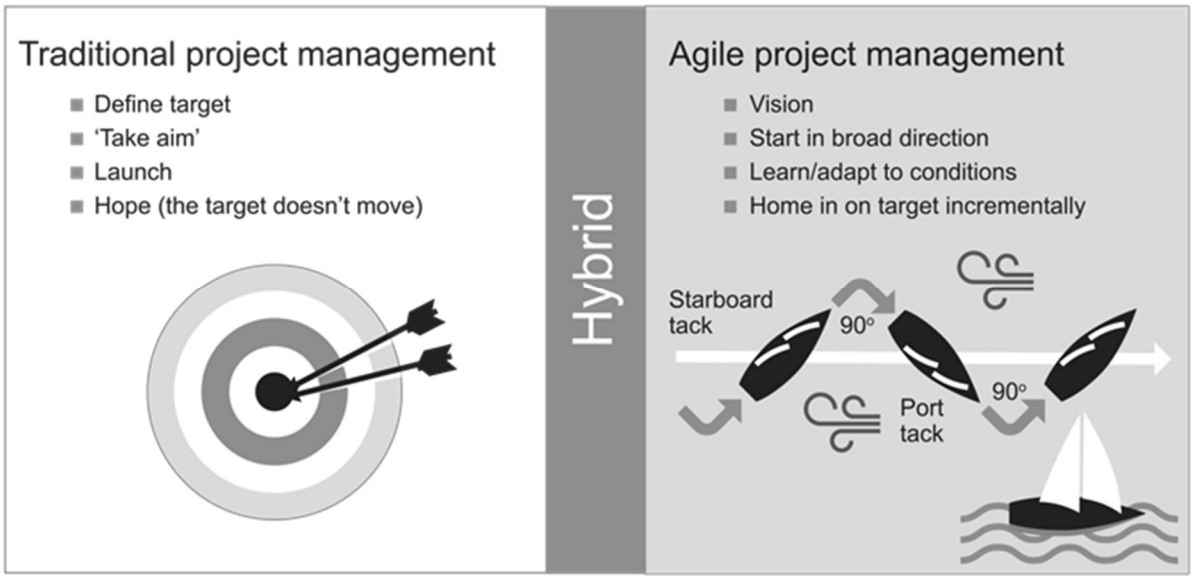


Diagram Source: Directing Agile Change

1.4 Agile Team

In the Agile concept, a "team" is a small group of people who are all working on the same initiative or endeavour full-time. A small percentage of team members may work part-time or have competing responsibilities. The concept of a team implies shared accountability: whether the results are positive or terrible, they should be credited to the entire group rather than any single person. The team is expected to have all of the required skills, whether they are technical (programming, design, testing) or business-related (domain knowledge, decision making ability). Results matter more than roles and responsibilities: a developer can test, analyse, or think about requirements; an analyst or domain expert can offer implementation ideas, and so on. (What is an Agile Team? n.d.).

When utilising the Scrum framework, for example, an Agile team should contain a Scrum master, a product owner, and any additional team members who are required. The Scrum master (sometimes referred to as the project manager) is in charge of overseeing the project, facilitating collaboration, and coordinating daily meetings. The product owner is in charge of making sure that the finished version fits the customer's needs. Subject matter experts and other stakeholders may be brought in to help with the project as needed, but they aren't usually considered members of the Agile team. (What Is an Agile Team? n.d.).

1.5 Agile Ceremonies

The Agile Scrum paradigm, according to the 2020 Scrum Guide, includes five major ceremonies:

a) **Sprint**
b) **Sprint Planning**
c) **Daily Scrum**
d) **Sprint Review,**
e) **Sprint Retrospective.**

Within the software development lifecycle, each ceremony plays a key role in increasing outputs and generating value (SDLC). There's one more ceremony to mention: the unofficial "**Product Backlog Grooming**" ceremony, which takes place during the Sprint and is an important part of scrum methods. To help eliminate complexity and extra meetings not stipulated in the scrum approach, all ceremonies should conduct at the same time and in the same location

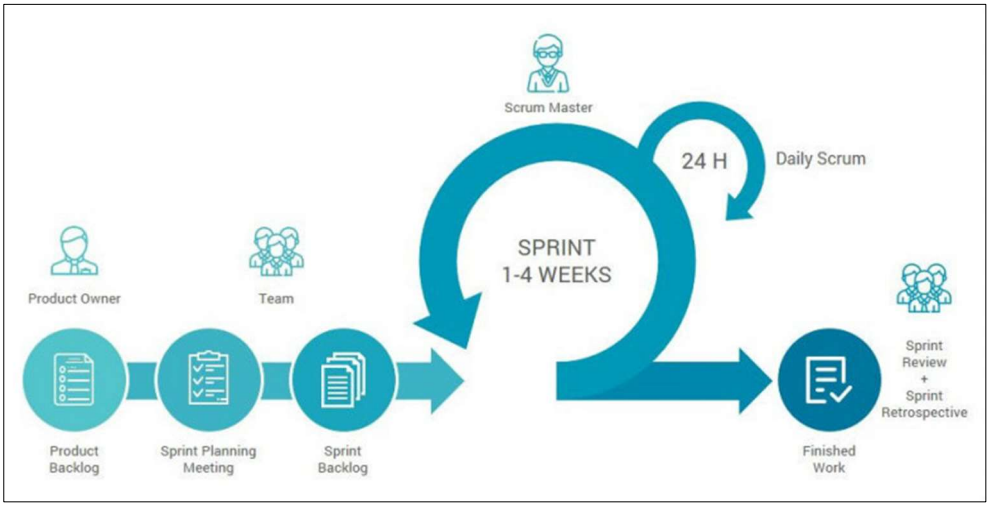


Image Source: (Santos, 2022)

Collaboration is highly valued in Agile, and this is not exclusive to Scrum. There are Kanban ceremonies such as cadences and Lean ceremonies such as kaizen events, for example. Any Agile strategy should include interaction, cooperation, and constant feedback. Finally, these techniques allow teams to deliver products that are both faster and higher quality. (Santos, 2022)

1.6 Artificial Intelligence AI- Definition

As per IBM, Artificial intelligence leverages computers and machines to mimic the problem-solving and decision-making capabilities of the human mind. (Education, 2020).
For designing and training machine learning algorithms, AI requires a foundation of specialised hardware and software. Although no single programming language is synonymous with AI, a few stand out, including Python, R, and Java.
AI systems, in general, work by consuming huge volumes of labelled training data, analysing the data for correlations and patterns, and then using these patterns to forecast future states. By examining thousands of samples, a chatbot fed examples of text chats may learn to make lifelike exchanges with people, and an image recognition programme can learn to recognise and describe items in photographs. Learning, reasoning, and self-correction are the three cognitive processes that AI programming focuses on. (Burns, Laskowski and Tucci, 2021).

1.7 Types of artificial intelligence

1.7.1 **Weak AI**- also called Narrow AI or Artificial Narrow Intelligence (ANI)—is AI trained and focused to perform specific tasks. Weak AI drives most of the AI that surrounds us today. 'Narrow' might be a more accurate descriptor for this type of AI as it is anything but weak; it enables some very robust applications, such as Apple's Siri, Amazon's Alexa, IBM Watson, and autonomous vehicles. (Education, 2020).

1.7.2 **Strong AI**- is made up of Artificial General Intelligence (AGI) and Artificial Super Intelligence (ASI). Artificial general intelligence (AGI), or general AI, is a theoretical form of AI where a machine would have an intelligence equalled to humans; it would have a self-aware consciousness that has the ability to solve problems, learn, and plan for the future. Artificial Super Intelligence (ASI)—also known as superintelligence—would surpass the intelligence and ability of the human brain. While strong AI is still entirely theoretical with no practical examples in use today, that doesn't mean AI researchers aren't also exploring its development. In the meantime, the best examples of ASI might be from science fiction, such as HAL, the superhuman, rogue computer assistant in 2001: A Space Odyssey. (Education, 2020).

1.8 AI- Powered Agile Project Management

Existing agile tools are useful, their support is limited to creating, managing, and tracking project artifacts, and visualizing historical project data such as burndown charts and other agile reports. Current agile project management tools lack advanced analytical methods that can harvest valuable insights from project data for prediction, estimation, planning and action recommendation. There are real challenges in running agile software projects and the serious lack of meaningful support for software teams and practitioners.
The potential of AI in offering significant support for managing agile projects, not only in automating routine tasks, but also in learning and harvesting valuable insights from project data for making predictions and estimations, planning, and recommending concrete actions.

1) It could help product owners to identify product backlog items (e.g. User stories and tasks)
2) Refine them (e.g., Decomposing an epic into a number of user stories, splitting user stories into small stories, and breaking a user story into a number of tasks)
3) Detect duplicates and dependencies.
4) It could help Development Team selecting items in the product backlog for the upcoming sprint.
5) Recommending optimal sprint plans.
6) Predicting future risks and mitigations. (H. K. Dam, 2019)

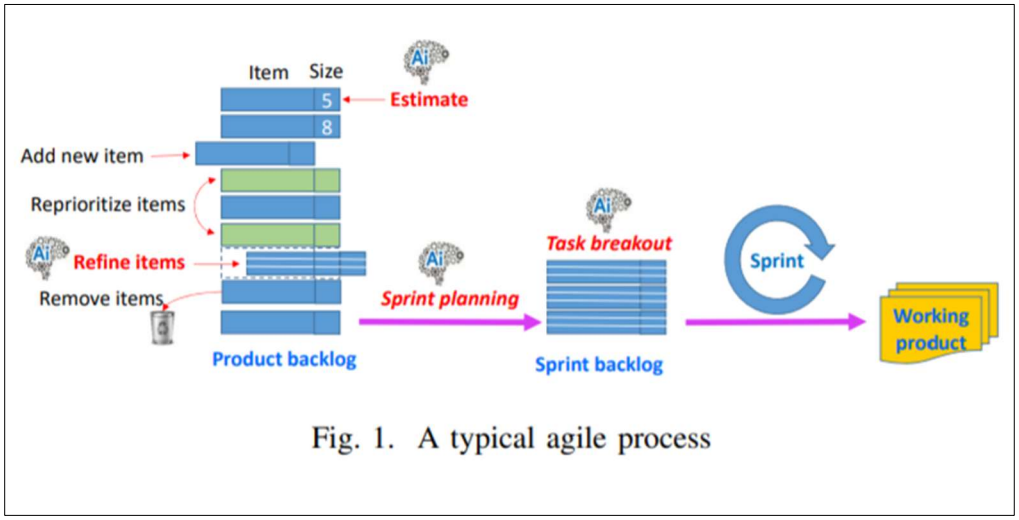


Fig. 1. A typical agile process

Image Source: (H. K. Dam, 2019)

1.9 UTAUT2 (Unified theory of Acceptance and Use of Technology 2)

The original UAUT2 model is used to understand the factors influencing the adoption and use of particular technology by an individual. It was developed by (Venkatesh et al., 2012).

The study is organised around the unified theory of acceptance and use of technology (UTAUT2). The theory of reasoned action (TRA), the technology acceptance model (TAM), the motivational model (MM), the theory of planned behaviour (TPB), the combined TAM-TPB model, the model of PC usage (MPCU), the IDT, and the social cognitive theory (SCT) are eight models that the UTAUT2 extends (Venkatesh et al., 2003; Venkatesh et al.,2012).

The UTAUT2 forecasts the adoption and use of a system or piece of technology. The predictors are determined by how valuable the technology/system is (performance expectancy); how easy it is to use the system (effort expectancy); the influence of the significant other (social influence); and the degree to which individuals perform behaviours automatically (habit); the degree of enjoyment when performing a task (hedonic motivation); the trade-off between benefits and costs of using the application/system (price value); and the organisational, technical adequacy.

The original UTAUT2 model has four moderators that mediate the relationships between the constructs: age, gender, voluntariness of use, and experience.

The research study is aiming at extending the model from the perspective of adopting Artificial Intelligence in the project management domain where agile framework is being used predominantly at both team and organization level.

The factor identified other than original 8 factors are AI self-Efficacy, Responsible AI, Sustainable AI.

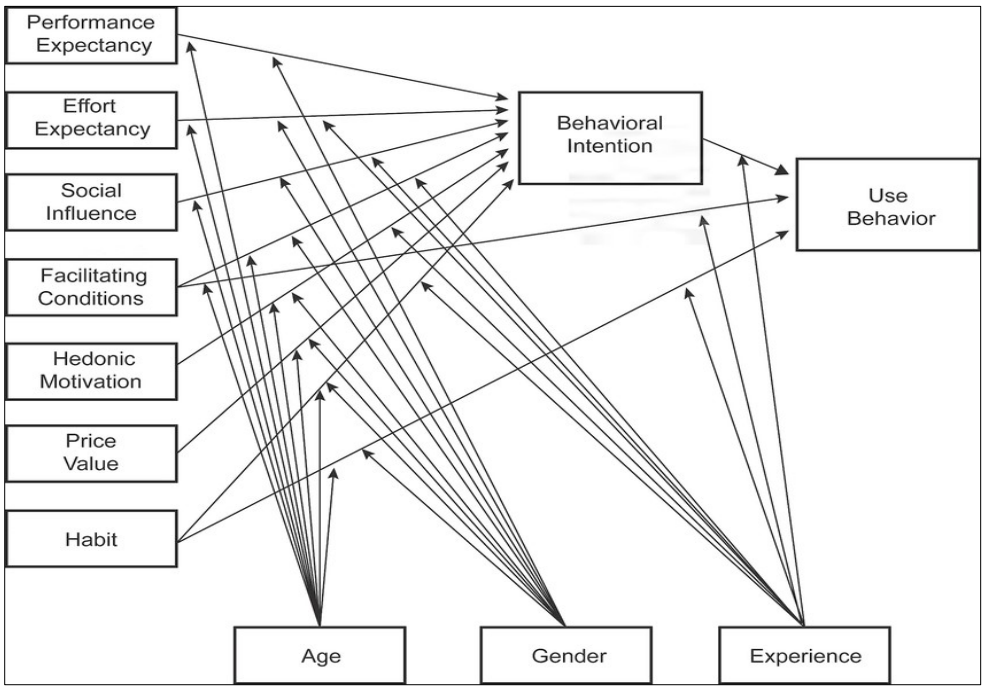
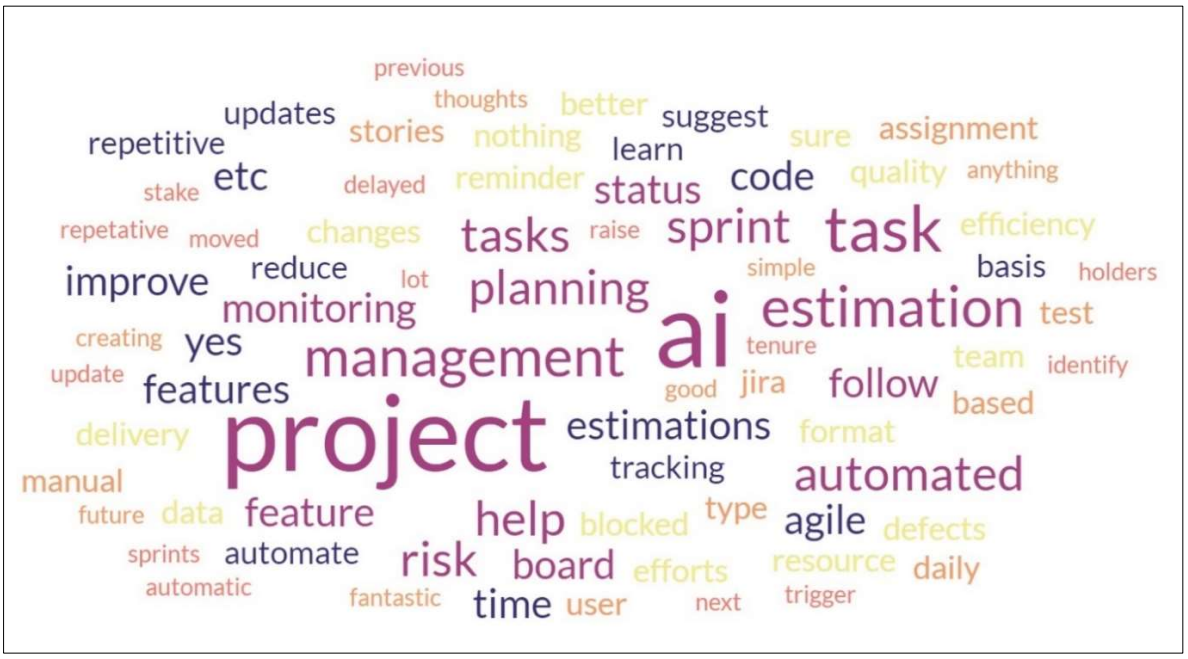


Image Ref: (Martin et al,,2018)

2. Review of Literature

2.1 Initial Information Gathering

Based on a survey, an open-ended question "Do you think about AI can support Agile project Management in better way? was asked. We received 78 responses; the word cloud is created to understand key words. The word cloud shows that AI can be used for **estimation, monitoring, tracking, assignment and planning activities** in Agile project management.



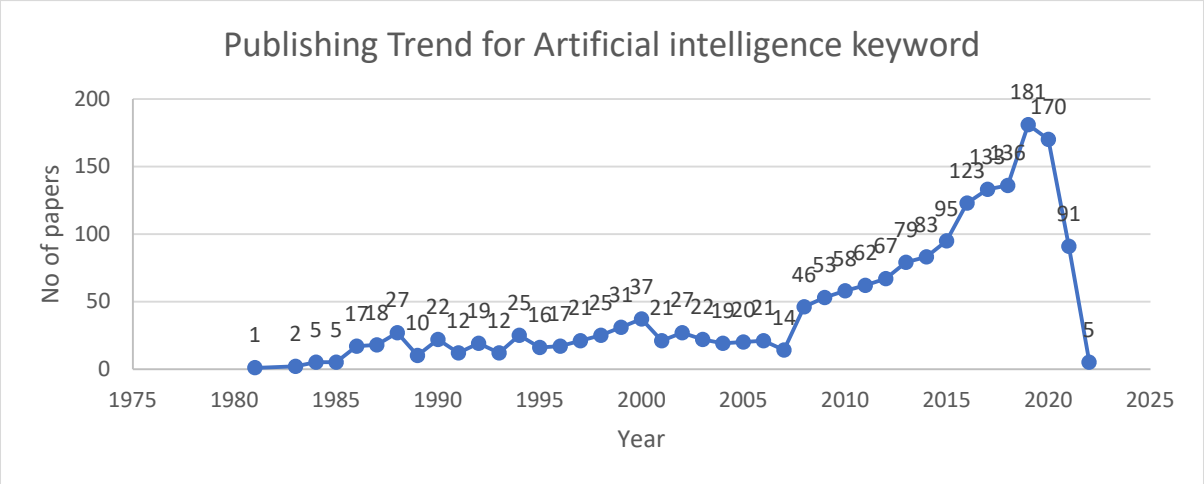
Word Cloud based on Survey response

2.2 Bibliometric analysis

After performing bibliometric analysis on the research papers from Scopus based on keywords of **Agile project management, Artificial Intelligence and UTAUT.** Referring (Yu et al., 2020) which was done on COVID data and parasitic disease data (Soosaraei et al., 2018) using VOS viewer software.

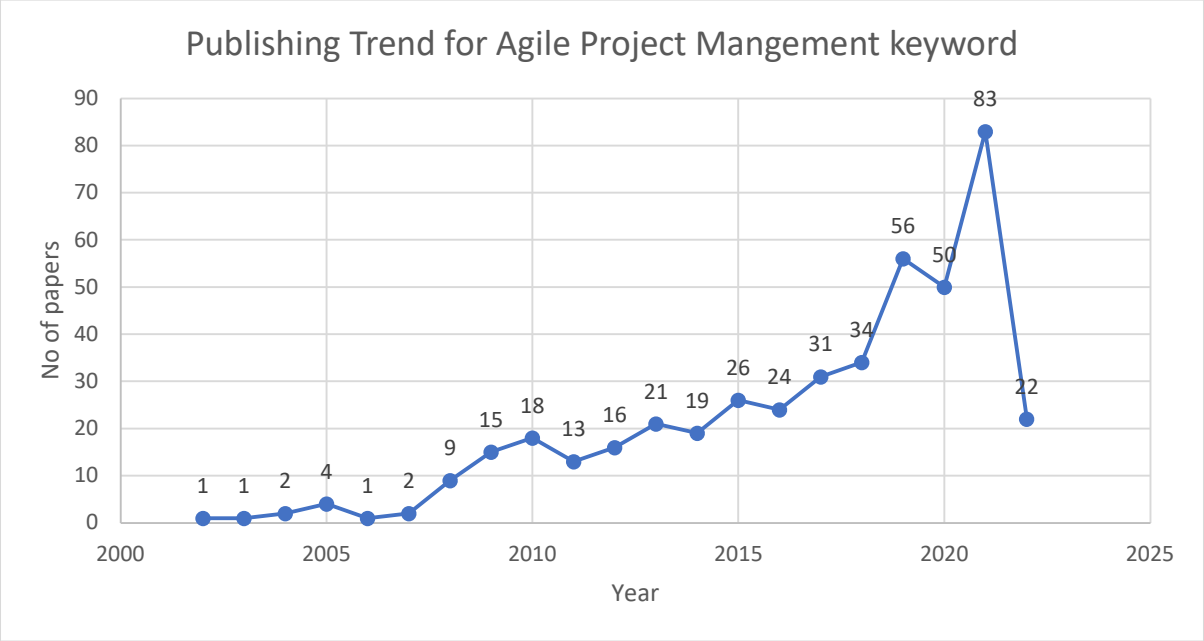
2.2.1 Publication trends on the papers published on Artificial Intelligence, Agile Project management and UTAUT Model

2.2.1.1 Publishing trend for key word Artificial Intelligence



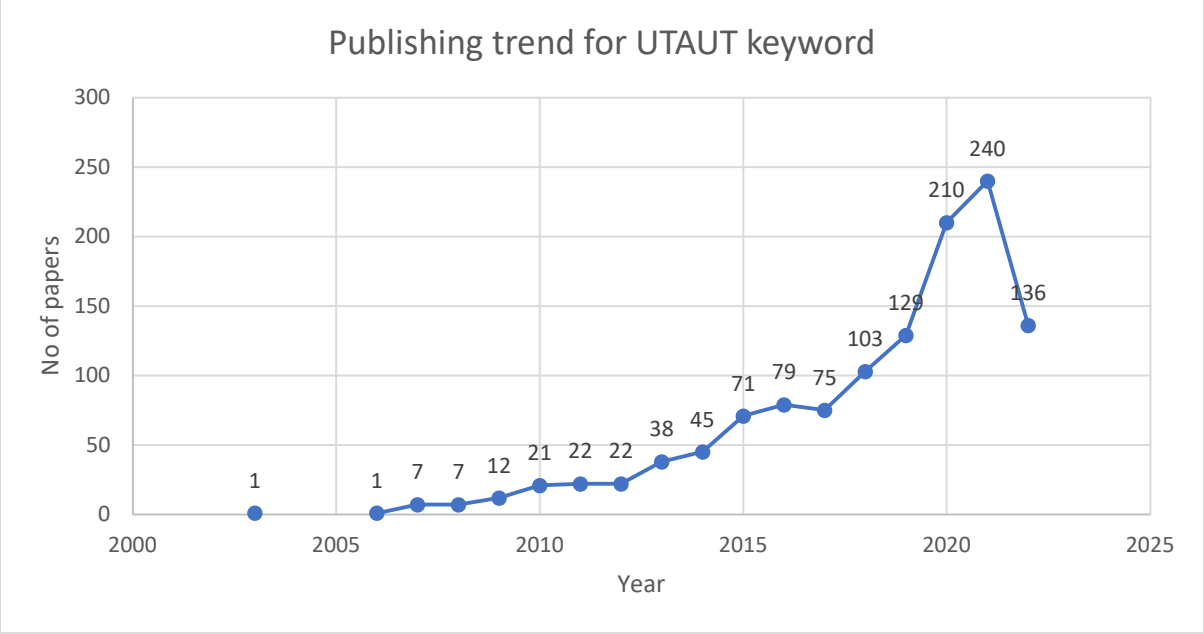
Total 1848 papers have been found on the topic in Scopus database. The concept is AI is the oldest among the three concepts studied here, the research papers can be seen from 1980, with constant trend till 2007, post that there has been increasing trend of research in the given field.

2.2.1.2 Publishing Trend for keyword Agile Project Management



Total 448 papers were found in Scopus Database, the Agile was invented in the spring of 2000 and ever since its growing and trending, the number of research work is also showing an upward trend, the trend is high post COVID pandemic shows people studied this framework during the time of disruption due to pandemic as one of the solutions to be nimbler and more resilient.

2.2.1.3 Publishing Trend for key word UTAUT

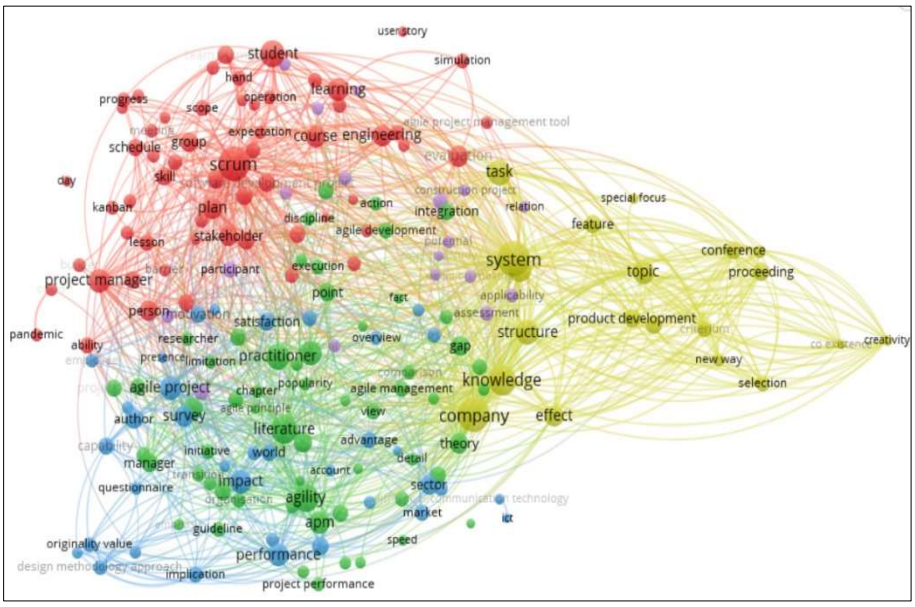


The UTAUT model is used to understand the adoption of technology for the particular usage, there is an increasing trend in research on this topic because of advancement of technology, post COVID pandemic we have seen digital disruption in domains like education, banking and web conferencing etc.

2.2.2 Network Maps on co-occurrence of keywords

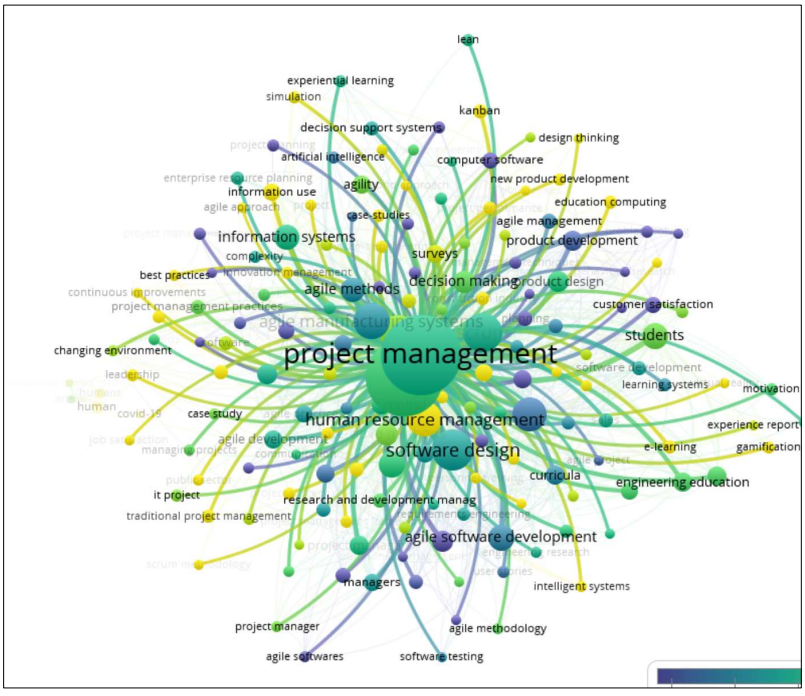
2.2.2.1 Network Map on Agile project Management as keyword and co-occurrence with different keywords.

From the below image, using agile project management to find the co-occurrence with other key words, the co-occurrence with AI is not found significantly, there is a research gap in this area which can be further explored.



Network Map on Agile project Management

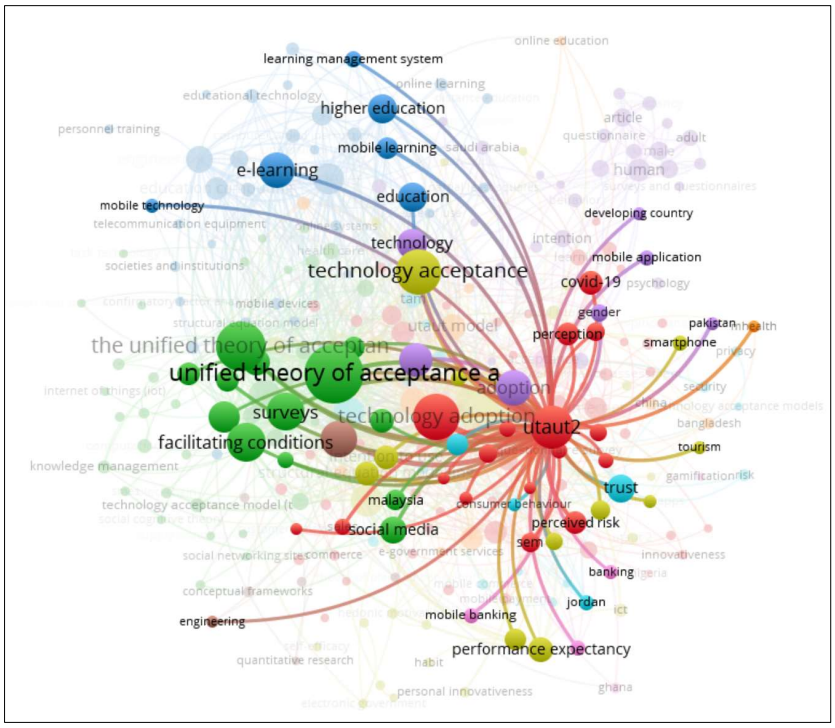
From the below co- occurrence of keywords from the search result of Agile project Management we can see, artificial intelligence linked to Project management and project management linked to Agile management, the research on agile project management and AI is still not observed majorly and can be explored from understanding application of AI techniques to support Agile project management.



Network Map on Agile project Management

2.2.2.2 Using UTAUT as a Keyword to find co- occurrence with other keywords

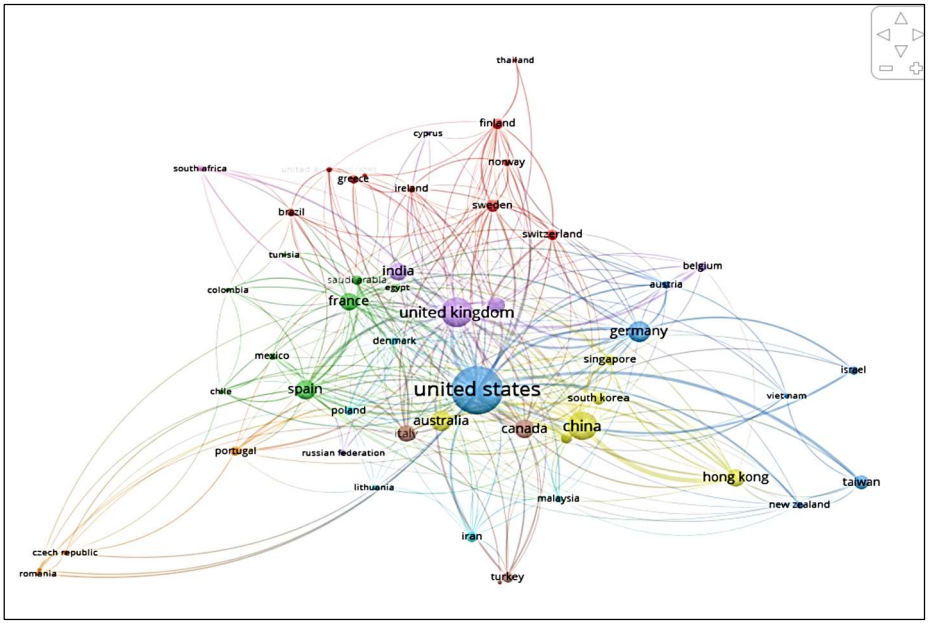
The below diagram represents occurrence of UTAUT model with other keywords, there is not much research from agile project management perspective as well as from AI technology adoption study. As we can see mobile banking, learning system, covid 19 research but nothing as of now majorly from AI point of view.



Network Map on UTAUT keyword

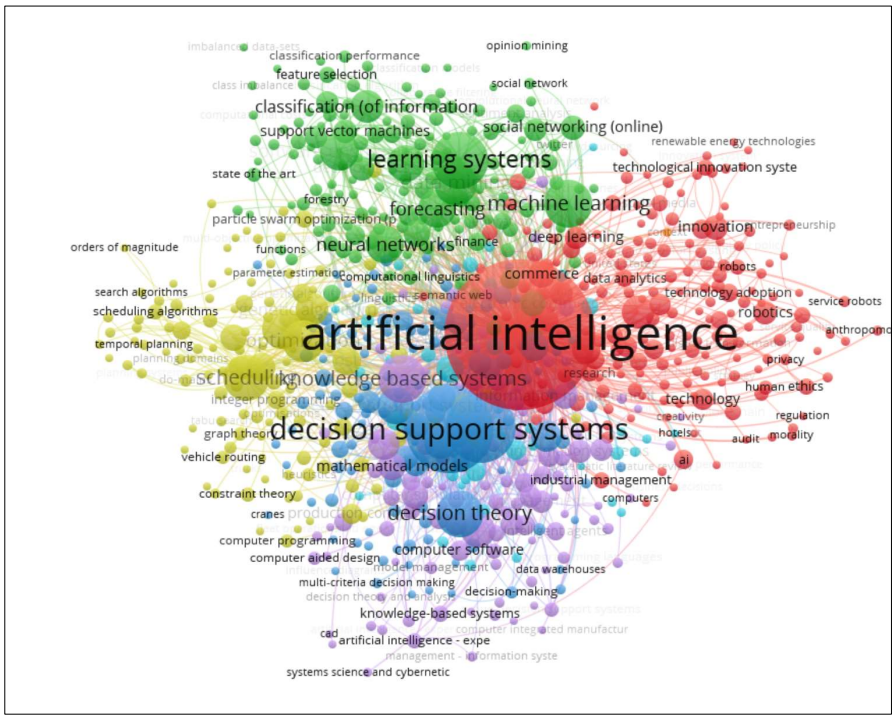
2.2.2.3 Using Artificial Intelligence as a Keyword for Analysis

From the below diagram, using Artificial Intelligence as keyword on Scopus data, it is discovered that not much work done in India, there is still scope to research on this artificial intelligence topic.



Country-wise research on AI

From the below diagram, it shows that when checking the occurrence of keyword with artificial intelligence, the agile project management is nowhere to be found and same is the case with UTAUT keyword only small part of technology adoption word can be seen, so we can explore the acceptance of AI technology in project management domain especially agile as no co- occurrence is found.



Network Map on Artificial Intelligence

2.3 List of a few key research papers reviewed

Topic	Region	Theory / Framework	Key factors (Variables) and Takeaway	Author
Using the UTAUT2 model to explain public acceptance of conditionally automated (L3) cars: A questionnaire study among 9,118 car drivers from eight European countries	Europe	UTAUT2	**Independent:** PE, EE, SI, FC, PV, HM, HB **Dependent:** BI, UB **Moderating:** Age, Gender, Experience	(Nordhoff et al., 2020)
Accenture Launches Intelligent Automation Platform to Deliver Smarter, More Efficient Application Services that Improve Business Outcomes	New York	Availability of intelligent automation platform for Agile Project Management	Accenture's myWizard intelligent automation platform replaces human technicians with artificial intelligence-powered virtual agents that are equipped with analytics and can draw on the company's extensive technology and in-depth sector knowledge.	(Accenture, 2019)

Meta-analysis of the unified theory of acceptance and use of Technology (utaut): challenging its validity and charting a Research agenda in the red ocean	USA, China, Durham	UTAUT	There are both formal and informal complaints that UTAUT, and by extension the technology adoption research stream, has peaked and offers little or no chances for the generation of new knowledge. Because the hypothesis hasn't been adequately and thoroughly replicated, such a result is ironic. It's likely that inaccurate conclusions about UTAUT's robustness and the availability of new work possibilities were caused by misspecifications in the numerous replications, applications, and extensions. It is impossible to determine the true nature of the effects of the original and extra factors without using the original specification faithfully, despite the fact that work on UTAUT has added significant variables, predictors, and moderators. The current meta-analysis tackles this problem using 25,619 effect sizes reported by 737,112 users in 1,935 distinct samples. In order to test the generalizability of UTAUT in various contexts, researchers develop a clear current state-of-the-art and revised UTAUT that extends the original theory with new endogenous mechanisms from various, other theories (such as **technology compatibility, user education, personal innovativeness, and costs of technology, technology type and national culture**)	(Blut et al., 2021)

Developing an Instrument for Assessing Self-Efficacy in Data Mining and Analysis	Taiwan	Self- Efficacy	A crucial concept in social science and information management is self-efficacy (Compeau and Higgins, 1995). It has important effects on the accomplishment and performance of tasks (Torkzadeh and Van Dyke, 2001). This study aims to empirically create a tool for evaluating a person's self-efficacy in data mining and analysis. An individual's assessment of their talents and skills to apply data mining techniques for analysis and discovery in a particular domain is represented by their self-efficacy in data mining and analysis (Bandura, 1997; Wilson et al., 2007; Wang Y. Y. et al., 2019). **Independent** Self-Efficacy	(Wang et al., 2021)
Sustainable AI: AI for sustainability and the sustainability of AI	Germany	Sustainable AI	It is time to go beyond this and address the sustainability of building and deploying AI systems. There is a rising movement towards AI for Sustainability (e.g. towards the sustainable development objectives). In this essay, the author offer a definition of "sustainably artificial intelligence" (sustainably AI), which she define as a movement to promote change throughout the entire lifecycle of artificial intelligence (AI) products, including idea generation, training, fine-tuning, implementation, and governance, in the direction of greater ecological integrity and social justice. Sustainable AI therefore targets the entire sociotechnical system of AI rather than just AI applications. In this article, the author has argued that developing AI that is compatible with surviving itself rather than simply sustaining AI development.	(van Wynsberghe, 2021)

			Independent Variable: Suistainable AI	
Responsible AI: requirements and challenges	France	Responsible AI	In light of two interconnected goals—(i) how to encourage research and development efforts toward socially good uses, and (ii) how to consider and minimise the human and social hazards of AI systems—this position paper explores the requirements and obstacles for responsible AI. **Independent Variable:** Responsible AI	(Ghallab, 2019)
The Application of Artificial Intelligence in Project Management Research: A Review	Spain	AI in Project Management	Numerous models are currently in the research and development stages across numerous industries, including science, economics, and engineering, as artificial intelligence continues to evolve at an exponential rate. The writers of this study examine a wide range of project management-related learning methodologies. The examination focuses primarily on hybrid systems, which offer computational representations of blended learning methodologies. Since these models are now in their infancy, the scientific community will	(Gil et al., 2021)

			need to make significant development efforts.	
Customer acceptance of mobile marketing in Jordan: An extended UTAUT2 model with trust and risk factors	Jordan	Extension of UTAUT 2 Model with trust and risk as additional Factor	This study identifies the factors that influence Jordanian consumers' adoption of mobile marketing. The unified theory of acceptance and use of technology (UTAUT2), which was expanded to incorporate the two new variables "trust" and "risk," is used in this inquiry. Data from 321 respondents was gathered for the empirical testing of the model, and variance-based structural equation modelling was used to test the hypotheses. Analysis was performed using SmartPLS 3.0. The results indicate that customers' behavioural intentions about the adoption of mobile marketing are highly influenced by performance expectations, effort expectations, hedonic incentive, social influence, price value, facilitating conditions, habit, and risk. It was discovered that the trust factor was a negligible predictor in this context.	(Eneizan et al., 2019)
Consumer acceptance and use of information Technology: extending the unified theory Of acceptance and use of technology1	USA , HongKong	Extension of UTAUT	In order to examine acceptance and use of technology in a consumer setting, this work expands the unified theory of acceptance and use of technology (UTAUT). Hedonic motivation, price value, and habit are three constructs that our revised UTAUT2 includes. The impacts of these dimensions on behavioural	Venkatesh et al.,2012

			intention and technology use are predicted to be moderated by individual characteristics, including age, gender, and experience. Results from a two-stage online survey of 1,512 mobile Internet users, with data on technology use gathered four months following the initial poll, validated our approach. Extensions suggested in UTAUT2 resulted in a significant improvement in the variance explained in behavioural intention (56 percent to 74 percent) and technology use compared to UTAUT (40 percent to 52 percent). These findings' theoretical and managerial ramifications are examined. **Independent:** PE, EE, SI, FC, PV, HM, HB **Dependent:** BI, UB **Moderating:** Age, Gender, Experience	

3. Research Gaps

All the above ROL revealed that there is a research gap on the given topic and can be explored further.

3.1 Agile Project Management: Numerous studies have shown that the Agile framework is used to deliver projects both during and after pandemics, making it a reliable framework. There isn't a lot of study on Agile project management from the standpoint of AI that can support everyday Agile tasks. The adoption of AI as a technology by people can therefore be further researched using the given approach.

3.2 Artificial Intelligence: Decision-making, forecasting, and several learning models have all benefited from the use of AI in a variety of sectors. Papers discussing AI's support for project management in general are present, but not specifically for project management carried out in an Agile manner, can be discovered. According to bibliometric data, there isn't a lot of AI research being done in India as compared to other countries like US, UK and China, thus this study may help change that.

3.3 UTAUT2: The technology adoption models UTAUT and UTATUT 2 are frequently used to comprehend behavioural intentions to utilise a specific technology and what are influencing factors for the same. This model has been used to study research on the adoption of mobile applications, e-learning, mobile banking, web meetings, and conferencing. This adoption has been researched more thoroughly during Pandemic. The adoption of AI for managing Agile projects may be examined using this paradigm in a manner similar to how agile is spreading more quickly at the team and organisational levels.

4. Research Questions and Objective

4.1. Managerial Questions

1. Can AI aid in the prioritising of data-driven Agile activities to determine which feature should be developed first in order to improve performance expectancy?
2. Can AI assist in estimating effort to deliver a specific feature within a specified time frame, making it a more palatable and simple solution?
3. Can an AI-powered Agile management solution identify risks that could arise during the delivery cycle, raise the relevant alerts, and offer the best course of action given the circumstances?

4.2. Research Objectives

1. To understand and examine the UTAUT2 Model from the standpoint of acceptability and intention to employ artificial intelligence for decision-making in Agile project management.
2. To evaluate the variables in the current UTAUT model and their connections to the adoption of AI-powered agile project management.
3. To propose an extended model with the variables AI Self-Efficacy, Responsible AI, and Sustainable AI to the already existing UTAUT2 model, create an extended model.

5. Theoretical Framework and Hypothesis Development

5.1. Theoretical Framework

9 UTAUT 2 Model factors will be considered in the proposed model as explained below (refer 1.9 in the same document)

1. Independent Variables

1. **Performance Expectancy (PE)-** The extent to which a technology will benefit consumers when used.
2. **Effort Expectancy (EE)-** The level of comfort associated with consumer use the given technology, here in this case how to operate with AI solution with project management tools for Agile Framework.
3. **Social Influence (SI)-** How strongly consumers believe that significant others (family and friends) think they should utilise a certain technology.
4. **Facilitating Condition (FC)-** Consumer impressions of the tools and assistance offered to carry out a behaviour
5. **Hedonic Motivation (HM)-** The enjoyment or pleasure experienced while utilising technology.
6. **Price Value (PV)-** The cognitive trade-off made by users between the programmes' ostensible advantages and their expense.,
7. **Habit Behaviour (HB)-** The degree to which individuals typically carry out behaviours automatically as a result of learning.

2. **Dependent Variables**

1. **Behavioural Intention (BI):** the intention to use AI for estimation and forecasting while using agile framework for project management.
2. **Use Behaviour (UB)-**The continuation to use particular technology, here in this case AI based algorithms to estimate story points, prioritisation and forecasting any risk.

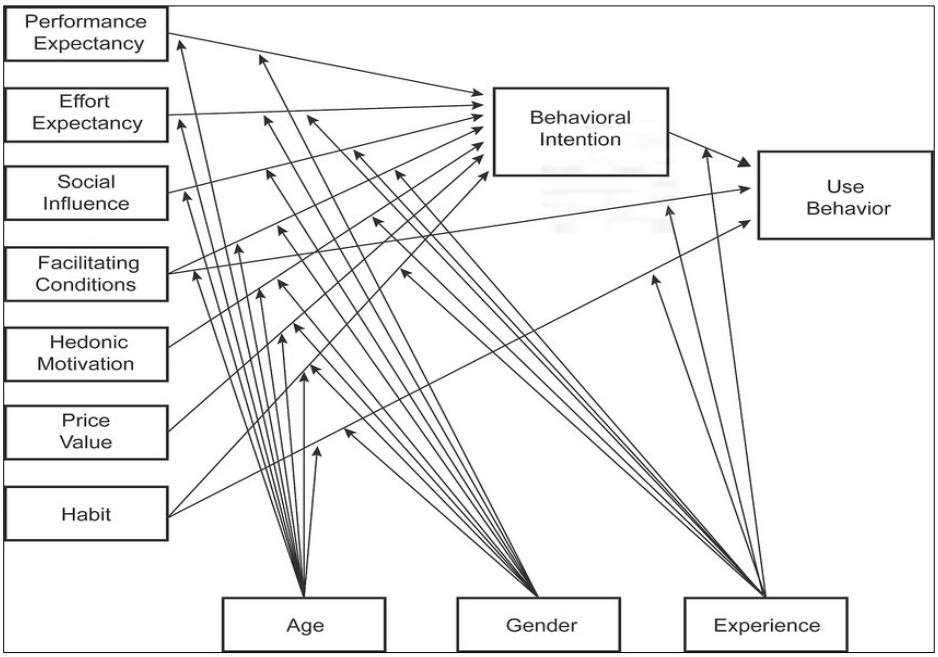
3. **Additional 3 Independent variables** - for extension

1. **AI Self-efficacy (AS)** refers to an individual's belief in his or her capacity to execute behaviours necessary to produce specific performance attainments (Bandura, 1977, 1986, 1997). Self-efficacy reflects confidence in the ability to exert control over one's own motivation, behaviour, and social environment.AI self-efficacy
2. **Sustainable AI (SA)**- The term Sustainable AI refers to AI research that yields novel results without increasing computational cost, and ideally reducing it and with low impact on environment and resources
3. **Responsible AI (RA)**- Responsible AI is the practise of designing, developing, and deploying AI with the purpose of empowering employees and organisations and having an equitable influence on consumers and society. This enables businesses to build trust and confidently scale AI.

4. **Moderating Variables**

1. **Age:** According to Morris et al. (2005) and Plude and Hoyer (1985), older customers typically have a harder time digesting new or complex information. This makes learning new technology more challenging for them. This challenge could be explained by the aging-related reduction in cognitive and memory ability (Posner 1996). As a result, older consumers have a tendency to value the availability of adequate support more highly than younger consumers (Hall and Mansfield 1975).
2. **Gender:** In addition, men are more willing than women to exert more effort to get past various obstacles and limitations in order to pursue their goals (Henning and Jardim 1977; Rotter and Portugal 1969; Venkatesh and Morris 2000). Men, on the other hand, tend to be more concerned with the amount of effort required and the method of achieving their goals. As a result, while considering the usage of a new technology, males rely less on enabling conditions, whereas women prefer to give external supporting aspects more weight. Men tend to be more task-oriented in society, which can also be partially explained by this (see, for example, Lynott and McCandless 2000).
3. **Experience: (**e.g., Kim and Malhotra 2005; Venkatesh et al. 2003), reflects a chance to utilise a target technology and is generally operationalized as the interval since a person first used the technology. For instance, the measure developed by Kim et al. (2005) comprises five categories with various experience levels. According to the passage of time, Venkatesh et al. (2003) operationalized experience into three levels: post-training, which was the time the system was first made accessible for usage; one month later; and three months later. Greater experience can result in a better understanding of the technology and understanding structures to speed up user learning, lowering the need for external support from the user (Alba and Hutchinson 1987).

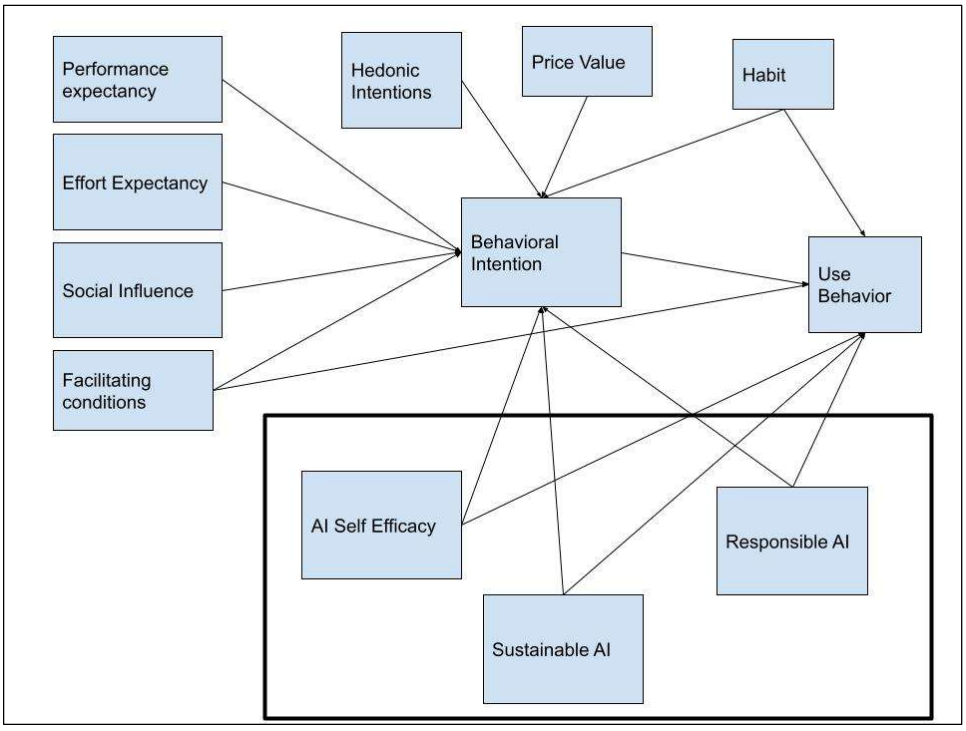
The factor identified other than original 8 factors are AI self-Efficacy, Responsible AI, Sustainable AI.



Original UTAUT2 Model

Image Ref: (Martin et al,,2018)

The research study will be carried out to extend the model with additional factors and moderation of these factors with Age, Gender and Experience.
Proposed extension of UTAUT2 with additional factors, these factors will be moderated by Age, Gender and Experience, for simplicity not added in proposed model.



Proposed extension of UTAUT2 Model

5.2. Hypothesis Development

H1: ***Performance expectancy*** **is a significant positive predictor of** ***behavioural intention*****,** implying that individuals who value the perceived benefits of AI-powered Agile project Management (i.e., *performance expectancy*) are more likely to intend to use them (i.e., *behavioural intention*) than individuals who are less likely to value the perceived benefits of AI-powered Project management Tool.

H2: ***Effort expectancy*** **is a significant positive predictor of** ***behavioural intention***, implying that individuals who perceive AI-powered Agile project Management as easy to use (i.e., *effort expectancy*) are more likely to *intend to use* them (i.e., behavioural intention) than individuals who are less likely to perceive AI-powered Agile Project Management as easy to use.

H3: ***Social influence*** **is a significant positive predictor of** ***behavioural intention*****,** implying that individuals who believe that important people in their social networks support their use of Ai-powered Agile Project Management (i.e., social influence) are more likely to *intend to use them (i.e., behavioural intention*) than individuals who are less likely to believe that their use of these kind of management software is supported in their social networks.

H4: ***Facilitating conditions*** **is a significant positive predictor of behavioural intention**, implying that individuals who believe that conditions facilitating their use of AI-powered Project Management are available (i.e., facilitating conditions) are more likely to *intend to use them* (i.e., behavioural intention) than individuals who are less likely to believe that facilitating conditions are available.

H5: ***Hedonic motivation*** **is a significant positive predictor of** ***behavioural intention***, implying that individuals who perceive AI-powered Agile Project Management as enjoyable (i.e., hedonic motivation) are more likely to intend to use them (i.e., behavioural intention) than individuals who are less likely to perceive AI-powered Agile Project Management as enjoyable.

H6: ***AI-Self Efficacy*** **is a significant positive predictor of** ***behavioural intention***, implying that individuals who perceive AI-powered Agile Project Management as enjoyable (i.e., hedonic motivation) are more likely to intend to use them (i.e., behavioural intention) than individuals who are less likely to perceive AI-powered Agile Project Management as enjoyable.

H7: ***Sustainable AI*** **is a significant positive predictor of** ***behavioural intention***, implying that individuals who perceive AI-powered Agile Project Management as enjoyable (i.e., hedonic motivation) are more likely to intend to use them (i.e., behavioural intention) than individuals who are less likely to perceive AI-powered Agile Project Management as enjoyable.

H8: ***Responsible AI*** **is a significant positive predictor of** ***behavioural intention***, implying that individuals who perceive AI-powered Agile Project Management as enjoyable (i.e., hedonic motivation) are more likely to intend to use them (i.e., behavioural intention) than individuals who are less likely to perceive AI-powered Agile Project Management as enjoyable.

H9: ***Age, gender and experience*** **with AI-powered Agile Project Management moderate the relationships** between *performance and effort expectancy, hedonic motivation, facilitating conditions, social influence, and behavioural intention to use* AI-powered Agile Project Management.

6. Research Design

The research will be both **qualitative and quantitative** research.
Purpose of the study: Explanatory research with hypothesis testing and to find causal effect- offers an enhanced understanding of the relationship that exists among variables which affects the AI-based agile management approach using UTAUT2 model and extending it with factors like AI self-efficacy, Responsible AI and Sustainable A
Type of investigation: Causal
Extent of researcher interference with the study- Minimal
Study setting: Non-contrived
Unit of analysis: Individual belonging to below groups-

a) Product owner
b) Scrum Master
c) Development Team Member: Developer, Tester, BA
d) Leadership

Time horizon of study: Cross-sectional
Sample Design:

The **simple random probabilistic sampling** is used. The sample size for the research is determined using **Andrew Fisher's Formula**. (KIBUACHA, 2021)

$$\text{Sample Size} = \frac{(\text{Z-score})^2 \times \text{StdDev} \times (1-\text{StdDev})}{(\text{confidence interval})^2}$$

The intended sample size is **385** using the aforementioned calculation with a confidence interval of 5% and a 95% confidence level with a z-score of 1.960. The research would comprise people from the software businesses in all Indian cities who fall under the aforementioned unit of analysis.

7. Data Collection and Analysis

7.1 Data Collection

Electronic questionnaires will be utilised to collect the data because the demographic being studied all work in the software business and so have high levels of computer literacy. Additionally, a Google form placed online will be user-friendly and available to the topic.
A few senior managements will participate in a structured interview over the phone or in person via video conferencing.

7.2 Data Analysis

The analysis will be done using excel or JASP software, with structural modelling for the factors contributing for intention of use and continue to use the technology.

The data analyses included the following:

1. The establishment of Cronbach 's alpha for the relevant scales.
2. Descriptive Analysis will be performed on demographic parameters of Age, Education and Experience as these are also moderating variables in UTAUT2 model

3. Structural Equation Modelling can be performed to model the relationship between various variables used in model as we are planning to extend the existing model by applying path least squares
4. The frequency distribution for several of the measures. Measures of Central Tendency and Dispersion or Descriptive statistics such as the mean and standard deviation.
5. Pearson correlation matrix.
6. Hypothesis testing using chi-square test
7. The conclusions are being drawn on the basis of hypothesis testing and data interpretation from the qualitative data analysis.

8. Expected Outcome of the study

1. The model will assist in structuring the process of data-driven decision making in agile project management.
2. Before investing in AI solutions for project management, the model will help to assess the readiness of an individual and the organisation as a whole.
3. The model can also assist in classifying an organization's features into the elements that influence use intend and usage persistence.

9. Timeline

	Activities	**Timeline** (months)
Literature Review	Search, capture and synthesise relevant literature	6
	Prepare draft literature review	
Research design	Drafting research design	2
	Reviewing Research design	
	Submitting research design	
Data Collection	Finalise sampling plan Sampling plan	6
	Develop data collection instrument	
	Pre-test/pilot data collection instrument	
	Finalised data collection instrument	
	Carry out data collection	
	Write up data collection	
Data analysis	Prepare data for analysis	4
	Analyse data	
	Draw conclusions/recommendations	
Writing up	Final draft of application	4
	Review draft	
	Final editing	
	Submit to University	

The first phase in the timeline is the literature review, that's where we search for, collect, and summarize pertinent literature to build a draft. The appropriate topic will subsequently be generated and approved and worked upon. The study design must be designed using pertinent information and planned appropriately. Following the completion of the research design, data collecting using the appropriate tools and techniques must be carried out. The data will be analysed and interpreted after data collection. Systematically recording the results, a final report will be drafted, submitted, and presented to the university.

10. Chapter Scheme

Title page
Certificate from Guide
Examiner's Sheet
Abstract
Chapter 1: Introduction
Chapter 2: Review of Literature and Conceptual Framework
Chapter 3: Research Methodology
Chapter 4: Data Collection and Analysis
Chapter 5: Results and Discussion
Chapter 6: Recommendations
6.1 Summary of suggestions
6.2 Limitations
6.3 Scope for further work
Appendix
References
Questionnaire
Acknowledgement

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